

What is claimed is:

1. A stamper for molding an optical disk base, comprising:
a transfer surface for molding the optical disk base; and
a heat insulating material extending in parallel to, but not contacting, said transfer surface.
2. A stamper as claimed in claim 1, wherein said heat insulating material has a thermal conductivity lower than 94 W/m.k.
3. A stamper as claimed in claim 1, wherein said heat insulating material comprises a heat resistant organic polymer.
4. A stamper as claimed in claim 3, wherein the heat resistant organic polymer comprises polyimide.
5. A stamper as claimed in claim 4, wherein the polyimide has a thickness between 5 μm and 150 μm .
6. A stamper as claimed in claim 3, wherein the heat resistant organic polymer comprises polyimideamide.
7. A stamper as claimed in claim 6, wherein the polyamideimide has a thickness between 5 μm and 150 μm .
8. A stamper as claimed in claim 1, wherein said heat insulating material comprises a heat resistant inorganic polymer.
9. A stamper as claimed in claim 8, wherein the heat resistant inorganic polymer comprises a ceramic.
10. A stamper as claimed in claim 9, wherein the ceramic has a thickness between 50 μm and 300 μm .
11. A stamper as claimed in claim 1, wherein said heat insulating material comprises a metal.

12. A stamper as claimed in claim 11, wherein the metal is close in a coefficient of linear expansion to Ni (nickel) used as a stamper material.

13. A stamper as claimed in claim 11, wherein the metal comprises Bi (bismuth).

14. A stamper as claimed in claim 13, wherein the Bi has a thickness between 150 μm and 300 μm .

15. A method of producing a stamper for molding an optical disk base, comprising the steps of:

electroforming on a photoresist master having a transfer surface pattern an Ni layer having a transfer surface to which said transfer surface pattern is transferred;

forming a heat insulating layer on said Ni layer; and
separating said photoresist master from said Ni layer.

16. A method as claimed in claim 15, further comprising the step of forming a second Ni layer on said heat insulating layer.

17. A method as claimed in claim 15, wherein said heat insulating material has a thermal conductivity lower than 94 W/m.k.

18. A method as claimed in claim 15, wherein said heat insulating material comprises a heat resistant organic polymer.

19. A method as claimed in claim 18, wherein the heat resistant organic polymer comprises polyimide.

20. A method as claimed in claim 19, wherein the polyimide has a thickness between 5 μm and 150 μm .

21. A method as claim d in claim 15, wherein the heat resistant

organic polymer comprises polyimideamide.

22. A method as claimed in claim 21, wherein the polyamideimide has a thickness between 5 μm and 150 μm .

23. A method as claimed in claim 15, wherein said heat insulating material comprises a heat resistant inorganic polymer.

24. A method as claimed in claim 23, wherein the heat resistant inorganic polymer comprises a ceramic.

25. A method as claimed in claim 24, wherein the ceramic has a thickness between 50 μm and 300 μm .

26. A method as claimed in claim 15, wherein said heat insulating material comprises a metal.

27. A method as claimed in claim 26, wherein the metal is close in a coefficient of linear expansion to Ni used as a stamper material.

28. A method as claimed in claim 26, wherein the metal comprises Bi.

29. A method as claimed in claim 28, wherein the Bi has a thickness between 150 μm and 300 μm .

30. A method of producing a stamper for molding an optical disk base, comprising the steps of:

electroforming on a mother stamper having an inverted transfer surface pattern an Ni layer having a transfer surface to which said inverted transfer surface pattern is transferred;

forming a heat insulating layer on said Ni layer; and

separating said mother stamper from said Ni layer.

31. A method as claimed in claim 30, further comprising the

step of forming a second Ni layer on said heat insulating layer.

32. A method as claimed in claim 30, wherein said heat insulating material has a thermal conductivity lower than 94 W/m. k.

33. A method as claimed in claim 30, wherein said heat insulating material comprises a heat resistant organic polymer.

34. A method as claimed in claim 33, wherein the heat resistant organic polymer comprises polyimide.

35. A method as claimed in claim 34, wherein the polyimide has a thickness between 5 μm and 150 μm .

36. A method as claimed in claim 30, wherein the heat resistant organic polymer comprises polyimideamide.

37. A method as claimed in claim 36, wherein the polyamideimide has a thickness between 5 μm and 150 μm .

38. A method as claimed in claim 30, wherein said heat insulating material comprises a heat resistant inorganic polymer.

39. A method as claimed in claim 38, wherein the heat resistant inorganic polymer comprises a ceramic.

40. A method as claimed in claim 39, wherein the ceramic has a thickness between 50 μm and 300 μm .

41. A method as claimed in claim 30, wherein said heat insulating material comprises a metal.

42. A method as claimed in claim 41, wherein the metal is close in a coefficient of linear expansion to Ni used as a stamper material.

43. A method as claimed in claim 41, wherein the metal comprises Bi.

44. A method as claimed in claim 43, wherein the Bi has a thickness between 150 μm and 300 μm .

45. A method of producing a stamper for molding an optical disk base, comprising the steps of:

forming photoresist on a glass master;

exposing said photoresist with a laser and then developing said photoresist to thereby form a transfer surface pattern of fine projections and recesses;

metallizing a surface of said photoresist formed with said transfer surface pattern and then electroforming a master transfer metal layer;

forming a master heat insulating layer on said master transfer metal layer;

forming a master metal layer on said master heat insulating layer; and

separating said glass master and then removing said photoresist.

46. A method as claimed in claim 45, wherein said master transfer metal layer and said master metal layer are formed of Ni.

47. A method as claimed in claim 46, wherein said master transfer metal layer is 100 μm to 25 μm thick.

48. A method as claimed in claim 46, wherein said master transfer metal layer is 25 μm to 5 μm thick.

49. A method as claimed in claim 45, wherein said master transfer metal layer is 100 μm to 25 μm thick.

50. A method as claimed in claim 45, wherein said master transfer metal layer is 25 μm to 5 μm thick.

51. A method of producing a stamper for molding an optical disk base, comprising the steps of:

producing a master by forming photoresist on a glass master, exposing said photoresist with a laser and then developing said photoresist to thereby form a transfer surface pattern of fine projections and recesses, metallizing a surface of said photoresist formed with said transfer surface pattern and then electroforming a master transfer metal layer, separating said glass master, and removing said photoresist;

producing a mother by executing peeling and film forming with said surface of said mater formed with said pattern and then electroforming a mother transfer metal electrode, said mother having an inverted transfer surface pattern to which said transfer surface pattern is transferred; and

producing a son stamper by executing peeling and film forming with said inverted transfer surface of said mother, sequentially forming a son transfer metal layer having a transfer surface to which said inverted transfer surface pattern is transferred, a son heat insulating layer, and a son metal layer, and separating said mother.

52. A method as claimed in claim 51, wherein said master transfer metal layer, said mother transfer metal layer, said son transfer metal layer, said master metal layer and said son metal layer are formed of Ni.

53. A method as claimed in claim 52, wherein said master transfer metal layer and said son transfer metal layer each are 100 μm to 25 μm thick.

54. A method as claimed in claim 52, wherein said master transfer metal layer and said son transfer metal layer each are 25 μm to 5 μm thick.

55. A method as claimed in claim 51, wherein said master transfer metal layer and said son transfer metal layer each are 100 μm to 25 μm thick.

56. A method as claimed in claim 51, wherein said master transfer metal layer and said son transfer metal layer are 25 μm to 5 μm thick.

57. A method of producing an optical disk base, comprising the steps of:

injecting molten resin into a cavity formed by a pair of mold parts and accommodating a stamper having a transfer surface for molding the optical disk base and a heat insulating layer extending in parallel to, but not contacting, said transfer surface; and

separating said pair of mold parts to thereby remove said resin cooled off.

58. A method of producing an optical disk, comprising the steps of:

injecting molten resin into a cavity formed by a pair of mold parts and accommodating a stamper having a transfer surface for molding the optical disk base and a heat insulating layer extending

in parallel to, but not contacting, said transfer surface;

separating said pair of mold parts to thereby remove said resin cooled off;

coating a transfer surface of said resin with a recording material to thereby form a light absorption layer;

forming a reflection film on said light absorption film; and

forming a protection film on said reflection film.

59. An optical disk base produced by a method comprising the steps of:

injecting molten resin into a cavity formed by a pair of mold parts and accommodating a stamper having a transfer surface for molding the optical disk base and a heat insulating layer extending in parallel to, but not contacting, said transfer surface; and

separating said pair of mold parts to thereby remove said resin cooled off.

60. An optical disk produced by a method comprising the steps of:

injecting molten resin into a cavity formed by a pair of mold parts and accommodating a stamper having a transfer surface for molding the optical disk base and a heat insulating layer extending in parallel to, but not contacting, said transfer surface;

separating said pair of mold parts to thereby remove said resin cooled off;

coating a transfer surface of said resin with a recording material to thereby form a light absorption layer;

forming a reflection film on said light absorption film; and
forming a protection film on said reflection film.

61. In a method of producing an optical disk base, a heat insulating material is positioned beneath a recording area formed on a surface of a stamper for molding an optical disk.

62. A method as claimed in claim 61, wherein said heat insulating material is absent around an outer edge and an inner edge of said stamper.

63. A method as claimed in claim 61, wherein said heat insulating material has a thermal conductivity lower than 94 W/m.k.

64. A method as claimed in claim 61, wherein said heat insulating material comprises a heat resistant organic polymer.

65. A stamper as claimed in claim 64, wherein the heat resistant organic polymer comprises at least one of polyimide and polyamideimide.

66. A stamper as claimed in claim 65, wherein at least one of the polyimide and polyamideimide has a total thickness of 150 μm or below.

67. A stamper as claimed in claim 61, wherein said heat insulating material comprises a heat resistant inorganic polymer.

68. A stamper as claimed in claim 67, wherein the heat resistant inorganic polymer comprises a ceramic.

69. A stamper as claimed in claim 68, wherein the ceramic has a thickness of 300 μm or below.

70. A stamper as claimed in claim 61, wher in said heat

insulating material comprises a metal.

71. A stamper as claimed in claim 70, wherein the metal is close in a coefficient of linear expansion to Ni used as a stamper material.

72. A stamper as claimed in claim 70, wherein the metal comprises Bi.

73. A stamper as claimed in claim 72, wherein the Bi has a thickness of 300 μm or below.

74. A stamper for molding an optical disk base produced by a method comprising the step of positioning a heat insulating material beneath a recording area formed on a surface of a stamper for molding an optical disk.

75. In an apparatus for molding an optical disk base including means for producing an optical disk base in accordance with a method of producing a stamper for molding said optical disk base, a heat insulating material is positioned beneath a recording area formed on a surface of a stamper for molding an optical disk.

76. In a method of producing an optical disk base by using a stamper for molding an optical disk in accordance with a method of producing said stamper, a heat insulating material is positioned beneath a recording area formed on a surface of a stamper for molding an optical disk.

77. A stamper for molding an optical disk base, comprising:
a transfer surface for molding the optical disk base;
a heat insulating material extending in parallel to, but not contacting, said transfer surface; and

guide grooves sequentially varied in configuration from an inner circumference toward an outer circumference.

78. A stamper as claimed in claim 77, wherein said guide grooves have depths sequentially increasing from the inner circumference toward the outer circumference.

79. A stamper as claimed in claim 78, wherein an outermost guide groove has a depth greater than a depth of an innermost guide groove by 50 Å to 500 Å.

80. A stamper as claimed in claim 78, wherein an outermost guide groove has a depth greater than a depth of an innermost guide groove by 100 Å to 300 Å.

81. A stamper as claimed in claim 77, wherein said guide grooves have widths sequentially increasing from an inner circumference toward an outer circumference.

82. A stamper as claimed in claim 81, wherein an outermost guide groove has a width greater than a width of an innermost guide groove by 0.02 μm to 0.1 μm .

83. A stamper as claimed in claim 77, wherein said heat insulating material has a thermal conductivity lower than 94 W/m.k.

84. A method as claimed in claim 77, wherein said heat insulating material comprises a heat resistant organic polymer.

85. A stamper as claimed in claim 84, wherein the heat resistant organic polymer comprises polyimide or polyamideimide.

86. A stamper as claimed in claim 85, wherein the polyimide or the polyamideimide is 5 μm to 150 μm thick.

87. A stamper as claimed in claim 77, wherein said heat insulating material comprises a heat resistant inorganic polymer.

88. A stamper as claimed in claim 87, wherein the heat resistant inorganic polymer comprises a ceramic.

89. A stamper as claimed in claim 88, wherein the ceramic is 50 μm to 300 μm thick.

90. A stamper as claimed in claim 77, wherein said heat insulating material comprises a metal.

91. A stamper as claimed in claim 90, wherein the metal is close in a coefficient of linear expansion to Ni used as a stamper material.

92. A stamper as claimed in claim 90, wherein the metal comprises Bi.

93. A stamper as claimed in claim 90, wherein the Bi is 150 μm to 300 μm thick.

94. In a base for molding an optical disk, guide grooves have a configuration sequentially varied from an inner circumference toward an outer circumference.

95. A base as claimed in claim 94, wherein an outermost guide groove has a depth greater than a depth of an innermost guide groove by 50 \AA to 500 \AA .

96. A base as claimed in claim 94, wherein an outermost guide groove has a depth greater than a depth of an innermost guide groove by 100 \AA to 300 \AA .

97. A base as claimed in claim 94, wherein an outermost guide groove has a width greater than a width of an innermost guide groove

by 0.02 μm to 0.1 μm .

98. In an optical disk, guide grooves have depths and widths sequentially increasing from an inner circumference toward an outer circumference, an outermost one of said guide grooves being deeper than an innermost one of said guide grooves by 100 Å or less and broader than said innermost one by 0.05 μm or less.